Translation of the claims as filed on October 26, 2004

1. Device for continuous evaporation of a high temperature superconductor (13) onto a substrate (7) in vacuum (6) comprising:

    a. a refilling device (5) with a stock of high temperature superconductor material (13);

    b. an evaporation device (1) which evaporates the high temperature superconductor material (13) in an evaporation zone by a beam (2) of an energy transferring medium;

    c. a conveyor (3) which transports the high temperature superconductor material (13) from the refilling device (5) to the evaporation zone in a way that

    d. the high temperature superconductor material (13) delivered to the evaporation zone is evaporated essentially without residues, **characterized in that**

    e. the conveyor transports the high temperature superconductor material (13) to the evaporation zone as a granulate (13) with a grain size of 0.05 – 0.5 mm.

2. Device according to claim 1, further comprising means to scan the beam (2) of the evaporator (1) in at least one direction over the evaporation zone.

3. Device according to claim 2, wherein the means are scanning the beam (2) at a repetition frequency > 50 Hz, preferably at about 90 Hz.

4. Device according to one of the claims 1 – 3, further comprising means to first pre–heat and then evaporate the high temperature superconductor material (13) delivered to the evaporation zone by the conveyor (3).

5. Device according to claim 4, where the evaporation device comprises at least two power levels (P_1,P_2) for the beam (2), preferably with a narrow transition width (Δx) between the first and the second power level to achieve a linear gradient of the thickness profile D(x) of the delivered high temperature superconductor material (13).

6. Device according to claim 5, wherein the conveying speed of the conveyor (3) can be adjusted such that the angle of the slope $\alpha < 20°$ and / or the length of the evaporation zone is < 10 mm.

7. Device according to one of the claims 5 or 6, wherein the beam (2) of the energy transferring medium can be focused in such a way that while scanning it reaches its minimum width when it is located essentially at the upper edge of the slope.

8. Device according to one of the claims 1 – 7,wherein the conveyor (3) and / or the substrate (7) can be tilted to compensate for an inclined directional pattern of the material evaporating from the conveyer (3).

9. Device according to one of the claims 1 - 8, wherein the evaporation device (1) comprises an electron beam evaporator which can be preferably modulated.

10. Device according to one of the claims 1 – 9, wherein the high temperature superconductor material (13) is conveyed into the evaporation zone in the shape of a line with a width preferably between 3 and 30 mm.

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11. Device according to one of the claims 1 – 10, wherein the conveyor transports the high temperature superconductor material (13) to the evaporation zone as a granulate (13) with a grain size of 0.1 – 0.2 mm.

12. Device according to one of the claims 1 – 11, wherein the conveyor (3) can be cooled and comprises a rotating turntable and / or a rotating drum and / or a vibration conveyor and / or a conveyor belt and / or a screw conveyor or slide.

13. Device according to one of the claims 1 – 12, wherein the refilling device is designed as a funnel (5) and / or can be heated.

14. Device according to one of the claims 1 – 13, wherein the refilling device (5) has a separate pumping device (12).

15. Device according to claim 14, wherein the refilling device (5) is designed as a funnel (5) which can be heated in the bottom section, and the separate pumping device (12) is designed as a suction pipe (12) which protrudes into the bottom section of the funnel (5).

16. Device according to one of the previous claims, wherein the high temperature superconductor material (13) is a mixture of different compounds so that upon evaporation on temporal average the desired composition of the high temperature superconductor material (13) is deposited.

17. Device according to one of the previous claims, further comprising means (9, 10) which enable to supply a gas, preferably oxygen, close to the substrate (7).

18. Device according to one of the previous claims, further comprising means (8) to heat and / or to move the substrate (7) relative to the evaporation zone.

19. Device according to one of the previous claims, further comprising means to measure the evaporation rate by atomic absorption spectroscopy, preferably of a Cu-line of the evaporating high temperature superconductor material.

20. Device according to claim 19, further comprising means to partially shade the vapor of the high temperature superconductor material at the location of the measuring light beam to avoid saturation of the absorption line.

21. Device according to one of the previous claims, further comprising at least another refilling device with source material for an auxiliary layer of the high temperature superconductor film.

22. Device according to claim 21, further comprising means to connect at least another refilling device and the refilling device (5) for holding a stock of high temperature superconductor material (13) sequentially with the conveyor (3).

23. Method for evaporating a high temperature superconductor coating onto a substrate (7) in vacuum (6) comprising the steps of:

    a. continuously conveying a granulate (13) of a high temperature superconductor material into a evaporation zone; and

    b. operating a beam (2) of an energy transferring medium, so that the delivered granulate (13) is evaporated essentially without residues within the evaporation zone, **characterized in that**

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c. the high temperature superconductor material (13) is conveyed to the evaporation zone as granulate (13) with a grain size of 0.05 – 0.5 mm.

24. Method according to claim 23, wherein the granulate (13) is delivered to the evaporation zone in the shape of a line (4).

25. Method according to claim 24, wherein the beam (2) of the energy transferring medium is guided over one end of the trace (4) so that the trace (4) is scanned essentially across its entire width and over a small section in the direction of the conveying motion.

26. Method according to one of the claims 23 – 25, wherein the high temperature superconductor is $RBa_2Cu_3O_7$ (R = yttrium, or an element with atomic number 57 to 71, or a mixture of these elements).

27. Method according to one of the claims 23 – 26, using a device according to claims 1 – 22.

28. High temperature superconductor coating produced by a method according to claims 23 – 27.